

# **Technology Education**

## **6–12**

### **Section 55**

# Technology Education 6–12

## **1 Knowledge of the nature and impacts of technology**

1. Identify the characteristics of technology.
2. Identify the inputs, processes, outputs, and feedback of technological systems.
3. Recognize the role of technology in developing and assessing products and systems that solve problems.
4. Identify the historical, social, cultural, economic, political, and environmental causes of technological development and change.
5. Identify the historical, social, cultural, economic, political, and environmental effects of technological development and change.
6. Identify emerging technologies (e.g., robotics, automation, nanotechnology) and their impacts on society.

## **2 Knowledge of principles of drafting and design**

1. Identify the use of drafting instruments, equipment, and materials.
2. Identify various areas of drafting.
3. Apply dimensioning, measurement, and graphing (e.g., Cartesian coordinates) skills.
4. Identify the technical skills needed for drawings (e.g., orthographic, pictorial, auxiliary view, layering, engineering, architectural).
5. Identify skills necessary for designing and building prototypes and virtual models.
6. Identify tools in using computer hardware for computer-aided drafting (CAD).
7. Identify appropriate design and problem-solving principles and procedures in drafting and design.

## **3 Knowledge of principles of engineering design**

1. Identify the basic principles of engineering.
2. Identify test equipment and data acquisition methods in engineering.
3. Identify principles of fluid, thermal, electrical, mechanical, and construction technologies.
4. Identify legal and ethical issues related to the field of engineering.

5. Identify engineering analysis and problem-solving procedures.
6. Identify appropriate design and problem-solving principles and procedures in engineering design.

#### **4 Knowledge of medical technologies**

1. Identify technological tools and their application in diagnosis, treatment, and prevention of diseases.
2. Identify technological advances in devices used to replace and repair the human body.

#### **5 Knowledge of agricultural and related biotechnologies**

1. Identify technological tools and their application in agriculture to control natural and man-made ecosystems.
2. Identify advances in technology that have increased food production for large populations.
3. Identify biotechnology applications in the areas of agriculture, pharmaceuticals, food and beverages, medicine, energy, environment, and genetic engineering.
4. Identify management techniques in agricultural systems and their effects on flora and fauna.

#### **6 Knowledge of energy and power technologies**

1. Identify origins and use of traditional and alternative energy sources (e.g., thermal, radiant, nuclear, electrical, mechanical, fluid).
2. Identify terminology of power sources (e.g., steam, diesel, internal combustion, hydraulic, pneumatic, electrical, jet, rocket, solar).
3. Identify characteristics of materials used in energy and power technologies.
4. Identify basic alternating current (AC) and direct current (DC) circuits and their components.
5. Apply Ohm's law and Kirchoff's law to basic circuits.
6. Identify the characteristics of different types of electronic circuitry (e.g., series, parallel, mixed, analog).

7. Identify the appropriate use of electronic equipment.
8. Identify appropriate design and problem-solving principles and procedures in power and energy technology.

## **7 Knowledge of information and communication technologies**

1. Identify the technological components of a communication system (i.e., source, encoder, transmitter, receiver, decoder, storage, retrieval, and destination).
2. Identify processes of communication using symbols, measurements, conventions, icons, graphic images, and language.
3. Identify the principles of design.
4. Identify the characteristics, components, and processes of prepress operations.
5. Identify the characteristics and components of major printing processes.
6. Identify the appropriate use of digital, electronic, laser, and fiber optics technologies in communication (e.g., copyright, Web design, audio and video production, desktop publishing).
7. Identify the components and processes of photography and digital and laser image generation.
8. Identify appropriate design and problem-solving principles and procedures in information and communication technology.

## **8 Knowledge of transportation technologies**

1. Evaluate subsystems (i.e., structural, propulsion, suspension, guidance, control, and support) of transportation vehicles.
2. Select appropriate transportation systems or components for use in manufacturing, construction, communication, and agricultural technologies.
3. Identify appropriate design and problem-solving principles and procedures in transportation technology.

## **9 Knowledge of manufacturing technologies**

1. Identify the characteristics of tools, materials, and processes used in manufacturing.
2. Identify types of manufacturing industries and their characteristics.

3. Identify legal and ethical issues related to manufacturing (e.g., environmental regulations, labeling requirements).
4. Identify types and characteristics of manufacturing systems (e.g., just-in-time, continuous, custom).
5. Identify the technical knowledge related to preprocessing, processing, and postprocessing in manufacturing.
6. Identify factors affecting choices in manufacturing materials and processes.
7. Select appropriate materials based upon their properties and characteristics (e.g., strength, weight, environmental impact).
8. Identify benefits of product planning and design and the development of prototypes.
9. Identify appropriate design and problem-solving principles and procedures in manufacturing technology.

## **10 Knowledge of construction technologies**

1. Identify the requirements for designing structures.
2. Identify how maintenance, alteration, and renovation improve structures or alter their intended uses.
3. Identify materials and processes in construction.
4. Identify factors involved in estimating, bidding, and scheduling.
5. Identify the components of subsystems of a structure.
6. Identify the materials, procedures, and equipment used in installing utilities.
7. Identify the constraints (e.g., building codes) and structural forces that affect residential, commercial, and civil structures.
8. Identify appropriate design and problem-solving principles and procedures in construction technology.

## **11 Knowledge of safety and laboratory management**

1. Identify safety precautions and practices in technology education laboratories.
2. Identify student guidelines for safe, functional use, storage, and maintenance of tools, materials, and supplies.

3. Identify safety precautions and practices in preventing and extinguishing fires.
4. Identify components of a safety training plan for students.
5. Identify equipment, materials, and supplies appropriate for program objectives.
6. Identify components of a records and filing system, including an inventory of tools, supplies, equipment, and student information documents.

## **12 Knowledge of technology education and professional development**

1. Use the universal definition of technology education to distinguish it from educational technology, applied science, and other fields.
2. Identify the social, historical, and philosophical foundations of technology education leading to contemporary programs.
3. Identify the Standards for Technological Literacy.
4. Identify the roles and purposes of standards (e.g., Standards for Technological Literacy, National Educational Technology Standards, and Florida Curriculum Frameworks) in curriculum planning and instruction.
5. Distinguish between process-centered and content-centered approaches to technology education.
6. Identify ways that technology education is integrated with academic courses.
7. Identify the relationship between technology education and the characteristics of careers and career clusters in construction, medical technologies, agriculture and related biotechnologies, engineering, information and communication technologies, transportation, manufacturing, energy and power technologies, and drafting.
8. Identify components of a plan for professional development.
9. Differentiate between professional and technical development.

## **13 Knowledge of standards-based instruction**

1. Identify appropriate instructional strategies that are consistent with the Standards for Technological Literacy.
2. Identify cognitive learning processes for solving technological problems.
3. Identify appropriate instructional strategies for teaching diverse populations in technology laboratories.

4. Select appropriate instructional strategies (e.g., design brief, technology learning activities [TLAs]) for teaching technological problem-solving skills.
5. Identify components of authentic contextual learning, from design to postproject evaluation.

#### **14 Knowledge of standards-based assessment**

1. Identify the student assessment standards from Advancing Excellence in Technological Literacy.
2. Identify appropriate methods for assessing cognitive and psychomotor learning processes in technology education.
3. Identify types, characteristics, and appropriate uses of measurement instruments.
4. Identify appropriate strategies for assessing student performance.
5. Identify how assessment results can guide professional development and improve instruction.
6. Identify audiences and needs for assessment information generated from technology education programs.